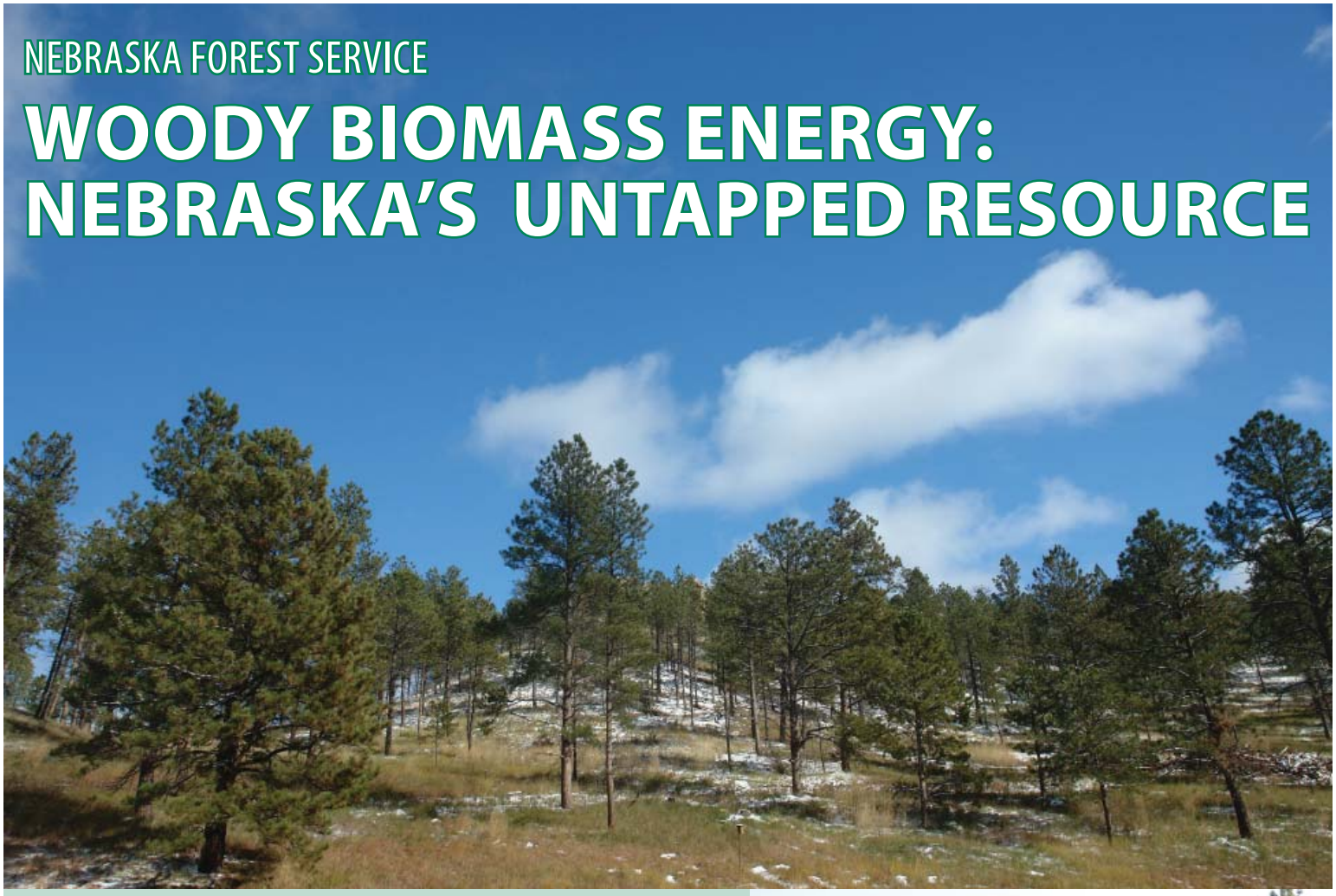
NEBRASKA FOREST SERVICE

WOODY BIOMASS ENERGY: NEBRASKA'S UNTAPPED RESOURCE



Energy security is a vital issue in the United States.

Heavy dependence on fossil fuels obtained from politically volatile areas, an emerging consensus that carbon emissions must be substantially reduced, and dramatically increasing costs of fuel oil and natural gas are driving the urgent need for alternative energy sources, both in Nebraska and nationally.

Further, rising energy costs are negatively impacting Nebraska's rural communities, many of which were already facing serious economic declines. Woody biomass is a carbon-neutral, clean-burning, renewable energy resource that can help solve these problems.

Nebraska-grown wood is an underutilized, plentiful, economic energy resource that can stimulate and revitalize our rural economies. ***Woody biomass is a proven, reliable energy source for both heating and cooling, as well as industrial applications, electricity generation and ethanol production.***

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WOOD ENERGY CAN HELP SOLVE PRESSING PROBLEMS IN NEBRASKA BY:

- reducing Nebraska's energy dependence on fossil fuels;
- creating jobs and new sources of income in depressed rural areas;
- reducing forest fuel loads and risk of catastrophic wildfires;
- creating markets for undesirable tree species, such as eastern redcedar cleared from grazing lands and Russian olive cleared from riparian areas;
- addressing scarce water issues in drought-stressed watersheds through sound forest and grassland management; and
- creating more productive, healthier forests and revitalized rural communities.

NEBRASKA'S AVAILABLE WOODY BIOMASS RESOURCES:

There is an assured supply of wood in Nebraska to support strategically located woody biomass-based enterprises.

- Nebraska has 1.3 million acres of timberland and another 400,000 acres of land with trees.
- These forests contain more than 41 million oven-dry tons of standing woody biomass.
- Of this biomass, 87 percent is on private land.
- Nebraska's forests produce at least 1 million net tons of wood per year, every year in perpetuity.
- 250,000 tons of waste wood from urban wood waste, wood processing by-products and forest fuel treatment programs in the Pine Ridge and Niobrara Valley are produced annually, less then half of which is utilized.
- 422 boilers located in public institutions across the state (e.g. , jails, hospitals, schools and universities) are more than 40 years old and are prime candidates for conversion to woody biomass.

WOODY BIOMASS—A PROVEN, RELIABLE ENERGY SOURCE FOR NEBRASKA AND BEYOND:

CURRENT USERS OF WOODY BIOMASS	WOOD USE (TONS)	ESTIMATED ANNUAL SAVINGS
Chadron State College, Chadron	9,000	$360,000
Lied Lodge & Conference Center, Nebraska City	3,500	$140,000
Northwest Missouri State University, Maryville, MO	16,200	$1,100,000
Multiple Alfalfa Dehydration Plants across Nebraska	12,500	~ 40 percent
American Wood Fibers, Clarks	Both businesses use an undocumented, but large, amount of waste wood generated by their saw-mill operations.	~ 40 percent
Midwest Walnut, Council Bluffs, IA		~ 40 percent

Facilities across Nebraska use woody biomass for heating and cooling, as well as industrial applications. Woody biomass energy is a renewable, carbon-neutral energy source that reduces Nebraska's dependence on fossil fuels, creates markets for undesirable tree species, such as Russian olive and eastern redcedar and helps protect precious water resources by promoting sound forest and grassland management. Woody biomass energy also stimulates rural economies by creating long-term, skilled jobs. However, only a small portion of Nebraska's available woody biomass resource is currently utilized.

COMPLETED ENGINEERING FEASIBILITY STUDIES FOR CONVERSION TO WOODY BIOMASS ENERGY:

FACILITY*	ECONOMIC FEASIBILITY	CONVERSION COST	WOOD USE (TONS)	PAYBACK PERIOD**	ESTIMATED ANNUAL SAVINGS
Chadron Community Hospital, Chadron	Positive	$396,000	400	8 years	$50,000
Crow Butte Resources, Inc., Crawford	Positive	$717,000	350	13.9 years	$52,000
Nebraska College of Technical Agriculture, Curtis	Positive	$675,000	1,040	13.5 years	$52,000
Peru State College, Peru	Positive	$2,000,000	3,200	11 years	$186,000
University of Nebraska–Lincoln, East Campus	Positive	$4,520,000	26,400	3.5 years	$1,306,000

***Payback periods shorten as costs increase for natural gas, propane and fuel oil.*

ADDITIONAL FACILITIES INTERESTED IN OR CURRENTLY CONDUCTING FEASIBILITY STUDIES:

FACILITY*	APPROXIMATE WOOD USE (TONS)	APPROXIMATE PAYBACK PERIOD**	ESTIMATED ANNUAL SAVINGS
Bluebird Nursery, Clarkson	2,000	5 years	$100,000
Cargill Soybean Processing Facility, South Sioux City	50,000	5-7 years	$2,000,000
Husker Ag Ethanol, Plainview	100,000	unavailable	unavailable
IAMS Pet Food, Aurora	inquiry only		
Nebraska Public Power District, Lexington	inquiry only		

**Many other facilities (schools, hospitals, large business facilities, etc.) could be economically converted to woody biomass energy.*
***Payback periods shorten as costs increase for natural gas, propane and fuel oil.*

OTHER EMERGING OPPORTUNITIES FOR WOOD ENERGY IN NEBRASKA:

Cellulosic ethanol
Emerging technologies show great promise for converting low-quality wood to ethanol.

Electrical power generation
Wood could be used to co-fire coal-burning power plants, reducing air pollution and offsetting carbon emissions.

Energy source for industrial applications
Replacing natural gas with woody biomass would increase the profitability of corn ethanol plants and reduce net carbon emissions. **At mid-2009 prices, wood chips are 40 percent cheaper per million BTUs than natural gas.**

Industrial energy products
Businesses that process wood into pelletized fuels show excellent potential for operation in rural forested areas.

Markets for woody biomass create year-round, skilled jobs in otherwise struggling rural areas. In the Pine Ridge, these fuels treatment projects, and the associated woody biomass utilization, have resulted in healthier, safer forests, created six full-time, year-round jobs and generated more than $1 million/year in economic impacts for the area. Debris from fuels treatment logging projects (left) is chipped (center) and hauled (right) to Chadron State College for use in its wood-fired heating and cooling system. In 1991 Chadron State College began using wood energy to heat its campus. In 2005 the college added a 600-ton wood-fired chiller and now uses 9,000 tons of wood chips/year to heat and cool more than 1 million square feet of building space.

The Nebraska Forest Service: Improving peoples' lives by protecting, utilizing and enhancing Nebraska's tree and forest resources.

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